

CLAIMS

1. A three-dimensional display method for displaying two-dimensional images, by changing  
5 brightness, on a plurality of display planes placed at different depth positions as seen from an observer to display a three-dimensional stereoscopic image, wherein, on a background plane displayed at an arbitrary position in a three-dimensional space,  
10 a display object having brightness darker than that of the background plane is displayed, the method comprising:

generating first two-dimensional images that are obtained by projecting the background plane  
15 onto the plurality of display planes along a line of sight of the observer, and displaying the first two-dimensional images on the display planes respectively wherein brightness of each of the first two-dimensional images is changed independently for  
20 each display plane; and

generating second two-dimensional images that are obtained by projecting the display object onto the plurality of display planes along the line of sight of the observer, and displaying the second  
25 two-dimensional images on the display planes respectively in which brightness of each of the two-dimensional images is set to be the same among the display planes.

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2. The three-dimensional display method as claimed in claim 1, wherein the brightness of each  
35 of the second two-dimensional images displayed on each display plane is 0.

3. The three-dimensional display method as  
5 claimed in claim 1, wherein each of the second two-  
dimensional images is a two-dimensional image in  
which the displayed brightness is controlled by  
pixel values having predetermined levels of gray,  
and each pixel value of each of the second two-  
10 dimensional images displayed on each display plane  
is 0.

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4. A three-dimensional display method for  
displaying two-dimensional images, by changing  
transparency, on a plurality of display planes  
placed at different depth positions as seen from an  
20 observer to display a three-dimensional stereoscopic  
image, wherein, on a background plane displayed at  
an arbitrary position in a three-dimensional space,  
a display object having brightness brighter than  
that of the background plane is displayed, the  
25 method comprising:

generating first two-dimensional images  
that are obtained by projecting the background plane  
onto the plurality of display planes along a line of  
sight of the observer, and displaying the first two-  
30 dimensional images on the display planes  
respectively wherein transparency of each of the  
first two-dimensional images is changed  
independently for each display plane; and

generating second two-dimensional images  
35 that are obtained by projecting the display object  
onto the plurality of display planes along the line  
of sight of the observer, and displaying the second

two-dimensional images on the display planes  
respectively in which transparency of each of the  
two-dimensional images is set to be the same among  
the display planes.

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5. The three-dimensional display method as  
10 claimed in claim 4, wherein the transparency of each  
of the second two-dimensional images displayed on  
each display plane is the maximum value.

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6. The three-dimensional display method as  
claimed in claim 4, wherein each of the second two-  
dimensional images is a two-dimensional image in  
20 which the transparency on the display plane is  
controlled by pixel values having predetermined  
levels of gray, and each pixel value of each of the  
second two-dimensional images displayed on each  
display plane is a value representing the maximum  
25 transparency.

30 7. The three-dimensional display method as  
claimed in any one of claims 1-6, wherein,  
the display object is character  
information;  
the background plane is a background of a  
35 screen on which the character information is input  
or edited; and  
a background plane of lines after a line

including a cursor indicating an inputting or editing position of the character information is displayed at a depth position different from a depth position at which a background plane of the line including the cursor and lines before the line including the cursor is displayed.

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8. The three-dimensional display method as claimed in any one of claims 1-6, wherein, the display object is character information;

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the background plane is a background of a screen on which the character information is input or edited; and

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a background plane of a line including a cursor indicating an inputting or editing position of the character information and lines after the line including the cursor is displayed at a depth position different from a depth position at which a background plane of lines before the line including the cursor is displayed.

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9. The three-dimensional display method as claimed in claim 7 or 8, wherein a button or a mark for displaying a menu indicating inputting or editing functions of the character information is displayed on a step part between two background planes displayed at different depth positions.

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10. The three-dimensional display method  
as claimed in any one of claims 1-6, wherein,  
the display object is character  
5 information;  
the background plane is a background of a  
screen on which the character information is input  
or edited; and  
a background plane of a selected character  
10 information part is displayed at a depth position  
different from a depth position at which a  
background plane of other character information is  
displayed.

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11. The three-dimensional display method  
as claimed in any one of claims 1-6, wherein,  
20 the display object is character  
information;  
the background plane is a background of a  
screen on which the character information is input  
or edited; and  
25 a background plane of a character  
information part that is searched by a search  
function is displayed at a depth position different  
from a depth position at which a background plane of  
other character information is displayed.

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12. The three-dimensional display method  
35 as claimed in any one of claims 1-6, wherein,  
the display object is character  
information;

the background plane is a background of a table or a menu in which character information are arranged and from which a piece of character information can be selected; and

5           a background plane of a selected character information part is displayed at a depth position different from a depth position at which a background plane of other character information is displayed.

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13. A three-dimensional display apparatus  
15   for displaying two-dimensional images, by changing brightness, on a plurality of display planes placed at different depth positions as seen from an observer to display a three-dimensional stereoscopic image, wherein, a display object is an object  
20   displayed on a background plane displayed at an arbitrary position in a three-dimensional space, and has brightness darker than that of the background plane, the apparatus comprising:

          first means for generating first two-  
25   dimensional images that are obtained by projecting the background plane onto the plurality of display planes along a line of sight of the observer;

          second means for displaying the first two-  
dimensional images generated by the first means on  
30   the display planes respectively wherein brightness of each of the first two-dimensional images is changed independently for each display plane so as to display the background plane at an arbitrary position in the three dimensional space;

35           third means for generating second two-dimensional images that are obtained by projecting the display object onto the plurality of display

planes along the line of sight of the observer; and  
fourth means for displaying the second  
two-dimensional images generated by the third means  
on the display planes respectively in which  
5 brightness of each of the two-dimensional images is  
set to be the same among the display planes.

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14. The three-dimensional display  
apparatus as claimed in claim 13, wherein the  
brightness of each of the second two-dimensional  
images displayed on each display plane is 0.

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15. The three-dimensional display  
20 apparatus as claimed in claim 13, wherein each of  
the second two-dimensional images is a two-  
dimensional image in which the displayed brightness  
is controlled by pixel values having predetermined  
levels of gray, and each pixel value of each of the  
25 second two-dimensional images displayed on each  
display plane is 0.

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16. A three-dimensional display apparatus  
for displaying two-dimensional images on a plurality  
of transmissive display apparatuses placed at  
different depth positions as seen from an observer  
35 to display a three-dimensional stereoscopic image,  
wherein, a display object is an object displayed on  
a background plane displayed at an arbitrary

position in a three-dimensional space, and has brightness brighter than that of the background plane, the apparatus comprising:

5 first means for generating first two-dimensional images that are obtained by projecting the background plane onto a plurality of display planes of the transmissive display apparatuses along a line of sight of the observer;

10 second means for displaying the first two-dimensional images on the transmissive display apparatuses respectively wherein transparency of each of the first two-dimensional images is changed independently for each transmissive display apparatus to display the background plane at an  
15 arbitrary position in the three-dimensional space; and

third means for generating second two-dimensional images that are obtained by projecting the display object onto the plurality of display  
20 planes if transmissive display apparatuses along the line of sight of the observer; and

fourth means for displaying the second two-dimensional images generated by the third means on the transmissive display apparatuses respectively  
25 in which transparency of each of the two-dimensional images is set to be the same among the transmissive display apparatuses.

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17. The three-dimensional display apparatus as claimed in claim 16, wherein the transparency of each of the second two-dimensional  
35 images displayed on each transmissive display apparatus is the maximum value.



18. The three-dimensional display  
5 apparatus as claimed in claim 16, wherein each of  
the second two-dimensional images is a two-  
dimensional image in which the transparency on the  
transmissive display apparatus is controlled by  
pixel values having predetermined levels of gray,  
10 and each pixel value of each of the second two-  
dimensional images displayed on each transmissive  
display apparatus is a value representing the  
maximum transparency.

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19. The three-dimensional display  
apparatus as claimed in any one of claims 13-18,  
20 wherein,

the display object is character  
information;

the background plane is a background of a  
screen on which the character information is input  
or edited; and  
25

the second means displays a background  
plane of lines after a line including a cursor  
indicating an inputting or editing position of the  
character information at a depth position different  
30 from a depth position at which a background plane of  
the line including the cursor and lines before the  
line including the cursor is displayed.

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20. The three-dimensional display

apparatus as claimed in any one of claims 13-16,  
wherein,

the display object is character  
information;

5 the background plane is a background of a  
screen on which the character information is input  
or edited; and

the second means displays a background  
plane of a line including a cursor indicating an  
10 inputting or editing position of the character  
information and lines after the line including the  
cursor at a depth position different from a depth  
position at which a background plane of lines before  
the line including the cursor is displayed.

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21. The three-dimensional display  
20 apparatus as claimed in claim 19 or 20, wherein the  
second means displays a button or a mark for  
displaying a menu indicating inputting or editing  
functions of the character information on a step  
part between two background planes displayed at  
25 different depth positions.

30 22. The three-dimensional display  
apparatus as claimed in any one of claims 13-18,  
wherein,

the display object is character  
information;

35 the background plane is a background of a  
screen on which the character information is input  
or edited; and

the second means displays a background plane of a selected character information part at a depth position different from a depth position at which a background plane of other character information is displayed.

23. The three-dimensional display apparatus as claimed in any one of claims 13-18, wherein,  
the display object is character information;  
the background plane is a background of a screen on which the character information is input or edited; and  
the second means displays a background plane of a character information part that is searched by a search function at a depth position different from a depth position at which a background plane of other character information is displayed.

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24. The three-dimensional display apparatus as claimed in any one of claims 13-18, wherein,  
the display object is character information;  
the background plane is a background of a table or a menu in which character information are arranged and from which a piece of character information can be selected; and  
the second means displays a background

plane of a selected character information part at a depth position different from a depth position at which a background plane of other character information is displayed.

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25. A program for causing a computer to  
10 function as a three-dimensional display apparatus for displaying two-dimensional images, by changing brightness, on a plurality of display planes placed at different depth positions as seen from an observer to display a three-dimensional stereoscopic  
15 image, wherein, a display object is an object displayed on a background plane displayed at an arbitrary position in a three-dimensional space, and has brightness darker than that of the background plane, the program causing the computer to function  
20 as:

first means for generating first two-dimensional images that are obtained by projecting the background plane onto the plurality of display planes along a line of sight of the observer;

25 second means for displaying the first two-dimensional images generated by the first means on the display planes respectively wherein brightness of each of the first two-dimensional images is changed independently for each display plane so as  
30 to display the background plane at an arbitrary position in the three dimensional space;

third means for generating second two-dimensional images that are obtained by projecting the display object onto the plurality of display  
35 planes along the line of sight of the observer; and

fourth means for displaying the second two-dimensional images generated by the third means

on the display planes respectively in which  
brightness of each of the two-dimensional images is  
set to be the same among the display planes.

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26. The program as claimed in claim 25,  
wherein the brightness of each of the second two-  
10 dimensional images displayed on each display plane  
is 0.

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27. The program as claimed in claim 25,  
wherein each of the second two-dimensional images is  
a two-dimensional image in which the displayed  
brightness is controlled by pixel values having  
20 predetermined levels of gray, and each pixel value  
of each of the second two-dimensional images  
displayed on each display plane is 0.

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28. A program for causing a computer to  
function as a three-dimensional display apparatus  
for displaying two-dimensional images on a plurality  
30 of transmissive display apparatuses placed at  
different depth positions as seen from an observer  
to display a three-dimensional stereoscopic image,  
wherein, a display object is an object displayed on  
a background plane displayed at an arbitrary  
35 position in a three-dimensional space, and has  
brightness brighter than that of the background  
plane, the program causing the computer to function

as:

first means for generating first two-dimensional images that are obtained by projecting the background plane onto a plurality of display  
5 planes of the transmissive display apparatuses along a line of sight of the observer;

second means for displaying the first two-dimensional images on the transmissive display apparatuses respectively wherein transparency of  
10 each of the first two-dimensional images is changed independently for each transmissive display apparatus to display the background plane at an arbitrary position in the three-dimensional space; and

15 third means for generating second two-dimensional images that are obtained by projecting the display object onto the plurality of display planes if transmissive display apparatuses along the line of sight of the observer; and

20 fourth means for displaying the second two-dimensional images generated by the third means on the transmissive display apparatuses respectively in which transparency of each of the two-dimensional images is set to be the same among the transmissive  
25 display apparatuses.

30 29. The program as claimed in claim 28, wherein the transparency of each of the second two-dimensional images displayed on each transmissive display apparatus is the maximum value.

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30. The program as claimed in claim 28,  
wherein each of the second two-dimensional images is  
a two-dimensional image in which the transparency on  
the transmissive display apparatus is controlled by  
5 pixel values having predetermined levels of gray,  
and each pixel value of each of the second two-  
dimensional images displayed on each transmissive  
display apparatus is a value representing the  
maximum transparency.

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31. The program as claimed in any one of  
15 claims 25-30, wherein,  
the display object is character  
information;

the background plane is a background of a  
screen on which the character information is input  
20 or edited; and

the second means displays a background  
plane of lines after a line including a cursor  
indicating an inputting or editing position of the  
character information at a depth position different  
25 from a depth position at which a background plane of  
the line including the cursor and lines before the  
line including the cursor is displayed.

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32. The program as claimed in any one of  
claims 25-30, wherein,  
the display object is character  
35 information;

the background plane is a background of a  
screen on which the character information is input

or edited; and

the second means displays a background plane of a line including a cursor indicating an inputting or editing position of the character information and lines after the line including the cursor at a depth position different from a depth position at which a background plane of lines before the line including the cursor is displayed.

10

33. The program as claimed in claim 31 or 32, wherein the second means displays a button or a mark for displaying a menu indicating inputting or editing functions of the character information on a step part between two background planes displayed at different depth positions.

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34. The program as claimed in any one of claims 25-30, wherein,

25 the display object is character information;

the background plane is a background of a screen on which the character information is input or edited; and

30 the second means displays a background plane of a selected character information part at a depth position different from a depth position at which a background plane of other character information is displayed.

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35. The program as claimed in any one of  
claims 25-30, wherein,

the display object is character  
5 information;

the background plane is a background of a  
screen on which the character information is input  
or edited; and

the second means displays a background  
10 plane of a character information part that is  
searched by a search function at a depth position  
different from a depth position at which a  
background plane of other character information is  
displayed.

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36. The program as claimed in any one of  
20 claims 25-30, wherein,

the display object is character  
information;

the background plane is a background of a  
table or a menu in which character information are  
25 arranged and from which a piece of character  
information can be selected; and

the second means displays a background  
plane of a selected character information part at a  
depth position different from a depth position at  
30 which a background plane of other character  
information is displayed.

35

37. A two-dimensional image generation  
method executed by a two-dimensional image output

apparatus for displaying two-dimensional images, by changing brightness, on a plurality of display planes placed at different depth positions as seen from an observer to display a three-dimensional stereoscopic image, comprising:

- 5 a two-dimensional image calculation step of calculating two-dimensional images, each corresponding to a display plane, of a display object and a background from image information of the display object and the background;
- 10 a brightness value determination step of determining whether a brightness value of the display object is equal to or less than a predetermined threshold and the brightness value of the display object is less than a brightness value of the background; and
- 15 a brightness value calculation step of, when it is determined that the brightness value of the display object is equal to or less than the predetermined threshold and the brightness value of the display object is less than the brightness value of the background, calculating the brightness value of each two-dimensional image of the background according to depth information of the display object
- 20 and setting brightness values of the two-dimensional images of the display object to be the same.

30

38. A two-dimensional image generation method executed by a two-dimensional image output apparatus for displaying two-dimensional images, by changing brightness, on a plurality of display planes placed at different depth positions as seen from an observer to display a three-dimensional stereoscopic image, comprising:
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a two-dimensional image calculation step  
of calculating two-dimensional images, each  
corresponding to a display plane, of a display  
object and a background from image information of  
5 the display object and the background;

a brightness value determination step of  
determining whether a brightness value of the  
display object is equal to or less than a  
predetermined threshold; and

10 a brightness value calculation step of,  
when the brightness value of the display object is  
equal to or less than the predetermined threshold,  
changing the brightness value of the background to a  
value greater than the brightness value of the  
15 display object, and calculating the brightness value  
of each two-dimensional image of the background  
based on the changed brightness value according to  
depth information of the display object and setting  
brightness values of the two-dimensional images of  
20 the display object to be the same.

25 39. A two-dimensional image generation  
method executed by a two-dimensional image output  
apparatus for displaying two-dimensional images, by  
changing transparency, on a plurality of display  
planes placed at different depth positions as seen  
30 from an observer to display a three-dimensional  
stereoscopic image, comprising:

a two-dimensional image calculation step  
of calculating two-dimensional images, each  
corresponding a display plane, of a display object  
35 and a background from image information of the  
display object and the background;

a brightness value determination step of

determining whether a brightness value of the display object is equal to or greater than a predetermined threshold and the brightness value of the display object is greater than a brightness  
5 value of the background; and

a transparency value calculation step of, when it is determined that the brightness value of the display object is equal to or greater than the predetermined threshold and the brightness value of  
10 the display object is greater than the brightness value of the background, calculating a transparency value of each two-dimensional image of the background according to depth information of the display object and setting transparency values of  
15 the two-dimensional images of the display object to be the same.

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40. A two-dimensional image generation method executed by a two-dimensional image output apparatus for displaying two-dimensional images, by changing transparency, on a plurality of display  
25 planes placed at different depth positions as seen from an observer to display a three-dimensional stereoscopic image, comprising:

a two-dimensional image calculation step of calculating two-dimensional images, each  
30 corresponding a display plane, of a display object and a background from image information of the display object and the background;

a brightness value determination step of determining whether a brightness value of the  
35 display object is equal to or greater than a predetermined threshold; and

a transparency value calculation step of,

when the brightness value of the display object is equal to or greater than the predetermined threshold, changing the brightness value of the background to a value less than the brightness value of the display object, and calculating the transparency value of each two-dimensional image of the background based on the changed brightness value according to depth information of the display object and setting transparency values of the two-dimensional images of the display object to be the same.

41. A two-dimensional image output apparatus for displaying two-dimensional images, by changing brightness, on a plurality of display planes placed at different depth positions as seen from an observer to display a three-dimensional stereoscopic image, comprising:

two-dimensional image calculation means for calculating two-dimensional images, each corresponding to a display plane, of a display object and a background from image information of the display object and the background;

brightness value determination means for comparing a brightness value of the display object with another brightness value; and

brightness value calculation means for calculating a brightness value of each two-dimensional image of the display object and the background based on the two-dimensional images calculated by the two-dimensional image calculation means and depth information of the display object and the background;

wherein, when it is determined that the brightness value of the display object is equal to

or less than the predetermined threshold and the  
brightness value of the display object is less than  
the brightness value of the background by the  
brightness determination means, the brightness value  
5 calculation means calculates the brightness value of  
each two-dimensional image of the background  
according to depth information of the display object  
and sets brightness values of the two-dimensional  
images of the display object to be the same.  
10

42. A two-dimensional image output  
15 apparatus for displaying two-dimensional images, by  
changing brightness, on a plurality of display  
planes placed at different depth positions as seen  
from an observer to display a three-dimensional  
stereoscopic image, comprising:

20 two-dimensional image calculation means  
for calculating two-dimensional images, each  
corresponding to a display plane, of a display  
object and a background from image information of  
the display object and the background;

25 brightness value determination means for  
comparing a brightness value of the display object  
with another brightness value; and

brightness value calculation means for  
calculating a brightness value of each  
30 two-dimensional image of the display object and the  
background based on the two-dimensional images  
calculated by the two-dimensional image calculation  
means and depth information of the display object  
and the background;

35 wherein, when it is determined that the  
brightness value of the display object is equal to  
or less than the predetermined threshold by the

brightness determination means, the brightness value calculation means changes the brightness value of the background to a value greater than the brightness value of the display object, and  
5 calculates the brightness value of each two-dimensional image of the background based on the changed brightness value according to depth information of the display object and sets  
10 brightness values of the two-dimensional images of the display object to be the same.

15 43. A two-dimensional image output apparatus for displaying two-dimensional images, by changing transparency, on a plurality of transmissive display apparatuses placed at different depth positions as seen from an observer to display  
20 a three-dimensional stereoscopic image, comprising:

two-dimensional image calculation means for calculating two-dimensional images, each corresponding to a transmissive display apparatus, of a display object and a background from image  
25 information of the display object and the background;

brightness value determination means for comparing a brightness value of the display object with another brightness value; and

30 transparency value calculation means for calculating a brightness value of each two-dimensional image of the display object and the background based on the two-dimensional images calculated by the two-dimensional image calculation means and depth information of the display object  
35 and the background;

wherein, when it is determined that the

brightness value of the display object is equal to or greater than the predetermined threshold and the brightness value of the display object is greater than the brightness value of the background by the  
5 brightness determination means, the transparency value calculation means calculates a transparency value of each two-dimensional image of the background according to depth information of the display object and sets transparency values of the  
10 two-dimensional images of the display object to be the same.

15

44. A two-dimensional image output apparatus for displaying two-dimensional images, by changing transparency, on a plurality of transmissive display apparatuses placed at different  
20 depth positions as seen from an observer to display a three-dimensional stereoscopic image, comprising:  
two-dimensional image calculation means for calculating two-dimensional images, each corresponding to a transmissive display apparatus,  
25 of a display object and a background from image information of the display object and the background;

brightness value determination means for comparing a brightness value of the display object  
30 with another brightness value; and

transparency value calculation means for calculating a brightness value of each  
two-dimensional image of the display object and the background based on the two-dimensional images  
35 calculated by the two-dimensional image calculation means and depth information of the display object and the background;



wherein, when it is determined that the brightness value of the display object is equal to or greater than the predetermined threshold by the brightness determination means, the transparency value calculation means changes the brightness value of the background to a value less than the brightness value of the display object, and calculates the transparency value of each two-dimensional image of the background based on the changed brightness value according to depth information of the display object and sets transparency values of the two-dimensional images of the display object to be the same.

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45. A program for causing a computer to function as a two-dimensional image output apparatus for displaying two-dimensional images, by changing brightness, on a plurality of display planes placed at different depth positions as seen from an observer to display a three-dimensional stereoscopic image, the program causing the computer to function as:

two-dimensional image calculation means for calculating two-dimensional images, each corresponding to a display plane, of a display object and a background from image information of the display object and the background;

brightness value determination means for comparing a brightness value of the display object with another brightness value; and

brightness value calculation means for calculating a brightness value of each two-dimensional image of the display object and the background based on the two-dimensional images

calculated by the two-dimensional image calculation means and depth information of the display object and the background;

5        wherein, when it is determined that the  
brightness value of the display object is equal to  
or less than the predetermined threshold and the  
brightness value of the display object is less than  
the brightness value of the background by the  
brightness determination means, the brightness value  
10 calculation means calculates the brightness value of  
each two-dimensional image of the background  
according to depth information of the display object  
and sets brightness values of the two-dimensional  
images of the display object to be the same.  
15

46. A program for causing a computer to  
20 function as a two-dimensional image output apparatus  
for displaying two-dimensional images, by changing  
brightness, on a plurality of display planes placed  
at different depth positions as seen from an  
observer to display a three-dimensional stereoscopic  
25 image, the program causing the computer to function  
as:

two-dimensional image calculation means  
for calculating two-dimensional images, each  
corresponding to a display plane, of a display  
30 object and a background from image information of  
the display object and the background;

brightness value determination means for  
comparing a brightness value of the display object  
with another brightness value; and

35        brightness value calculation means for  
calculating a brightness value of each  
two-dimensional image of the display object and the

background based on the two-dimensional images  
calculated by the two-dimensional image calculation  
means and depth information of the display object  
and the background;

5                wherein, when it is determined that the  
brightness value of the display object is equal to  
or less than the predetermined threshold by the  
brightness determination means, the brightness value  
calculation means changes the brightness value of  
10 the background to a value greater than the  
brightness value of the display object, and  
calculates the brightness value of each two-  
dimensional image of the background based on the  
changed brightness value according to depth  
15 information of the display object and sets  
brightness values of the two-dimensional images of  
the display object to be the same.

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47. A program for causing a computer to  
function as a two-dimensional image output apparatus  
for displaying two-dimensional images, by changing  
25 transparency, on a plurality of transmissive display  
apparatuses placed at different depth positions as  
seen from an observer to display a three-dimensional  
stereoscopic image, the program causing the computer  
to function as:

30                two-dimensional image calculation means  
for calculating two-dimensional images, each  
corresponding to a transmissive display apparatus,  
of a display object and a background from image  
information of the display object and the  
35 background;

                 brightness value determination means for  
comparing a brightness value of the display object

with another brightness value; and

transparency value calculation means for  
calculating a brightness value of each  
two-dimensional image of the display object and the  
5 background based on the two-dimensional images  
calculated by the two-dimensional image calculation  
means and depth information of the display object  
and the background;

wherein, when it is determined that the  
10 brightness value of the display object is equal to  
or greater than the predetermined threshold and the  
brightness value of the display object is greater  
than the brightness value of the background by the  
brightness determination means, the transparency  
15 value calculation means calculates a transparency  
value of each two-dimensional image of the  
background according to depth information of the  
display object and sets transparency values of the  
two-dimensional images of the display object to be  
20 the same.

25 48. A program for causing a computer to  
function as a two-dimensional image output apparatus  
for displaying two-dimensional images, by changing  
transparency, on a plurality of transmissive display  
apparatuses placed at different depth positions as  
30 seen from an observer to display a three-dimensional  
stereoscopic image, the program causing the computer  
to function as:

two-dimensional image calculation means  
for calculating two-dimensional images, each  
35 corresponding to a transmissive display apparatus,  
of a display object and a background from image  
information of the display object and the

background;

brightness value determination means for comparing a brightness value of the display object with another brightness value; and

5 transparency value calculation means for calculating a brightness value of each two-dimensional image of the display object and the background based on the two-dimensional images calculated by the two-dimensional image calculation means and depth information of the display object  
10 and the background;

wherein, when it is determined that the brightness value of the display object is equal to or greater than the predetermined threshold by the  
15 brightness determination means, the transparency value calculation means changes the brightness value of the background to a value less than the brightness value of the display object, and calculates the transparency value of each two-  
20 dimensional image of the background based on the changed brightness value according to depth information of the display object and sets transparency values of the two-dimensional images of the display object to be the same.

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